WHAT IS CLAIMED IS:

1. A field emission display device, comprising:

a faceplate and a baseplate;

a luminescent phosphor coating applied to a lower surface of the faceplate to form phosphorescent pixel sites; and

a cathode member formed on the baseplate to form individual electron-emission sites which emit electrons to activate the phosphors, the cathode member comprising:

a semiconductor layer overlying a substrate, the semiconductor layer including an emitter tip;

an aluminum layer surrounding the tip and incorporating nitrogen;

an insulating layer surrounding the tip and overlying the aluminum layer; and

a conductive layer surrounding the tip and overlying the insulating layer.

2. The display device of Claim 1, wherein the conductive layer comprises a second aluminum layer incorporating nitrogen.

3. The display device of Claim 1, wherein the cathode member further comprises a layer of grid silicon between the insulating layer and the conductive layer.

4. The display device of Claim 1, wherein the aluminum layer comprises an atomic composition of about 2% - 10% nitrogen.

5. The display device of Claim 1, wherein the aluminum layer comprises an atomic composition of about 5% - 8% nitrogen.

6. The display device of Claim 1, wherein the aluminum layer has a resistivity of less than about 10 $\mu\Omega$ cm.

7. The display device of Claim 1, wherein the aluminum layer has a surface roughness of about 300 Å to 400 Å.

8. The display device of Claim 1, wherein the aluminum layer is substantially hillock-free.

9. A field emission cathode, comprising:

a substrate;

an emitter tip formed on the substrate;

an aluminum film overlying said substrate and surrounding said emitter tip, said aluminum film including nitrogen;

a gate layer formed above the aluminum film and surrounding said tip,

10. The cathode of Claim 9, wherein said gate layer comprises aluminum and nitrogen.

11. The cathode of Claim 9, wherein the aluminum film comprises an aluminum nitride subphase.

12. The cathode of Claim 9, further comprising a dielectric layer between the gate layer and the aluminum film.

13. The cathode of Claim 12, further comprising a layer of grid silicon between the dielectric layer and the gate layer.

14. The cathode of Claim 13, further comprising a semiconductor layer between the dielectric layer and the aluminum film.

15. The cathode of Claim 14, wherein the aluminum film comprises an atomic composition of about 2% - 10% nitrogen.

16. The cathode of Claim 15, wherein the aluminum film comprises an atomic composition of about 5% - 8% nitrogen.

17. The cathode of Claim 15, wherein the aluminum film has a resistivity of less than about 10 μΩ cm.

18. The cathode of Claim 15, wherein the aluminum film has a surface roughness of about 300 Å to 400 Å.

19. The cathode of Claim 15, wherein the aluminum film is substantially hillock-free.

20. A method of forming a field emission display device comprising the steps of:

providing a faceplate and a baseplate;

applying a luminescent phosphor coating to a lower surface of the faceplate to form phosphorescent pixel sites; and

forming a cathode member on the baseplate to form individual electron-emission sites which emit electrons to activate the phosphors, the steps of forming the cathode member comprising:

providing a semiconductor layer overlying a substrate, the semiconductor layer including an emitter tip;

depositing an aluminum layer on the substrate surrounding the tip and introducing nitrogen during depositing;

forming an insulating layer surrounding the tip and overlying the aluminum layer; and

depositing a conductive layer surrounding the tip and overlying the insulating layer

21. The cathode of Claim 20, further comprising providing a layer of grid silicon between the insulating layer and the conductive layer.

22. The cathode of Claim 20, wherein the aluminum layer comprises an atomic composition of about 2% - 10% nitrogen.

23. The cathode of Claim 20, wherein the aluminum layer is substantially hillock-free.

24. The method of Claim 20, wherein said conductive layer is an aluminum film, and further comprising introducing nitrogen while depositing said aluminum film.

25. The method of Claim 24, comprising sputtering a substantially pure aluminum target in a chamber housing the substrate.

26. The method of Claim 24, wherein the conductive layer comprises an atomic composition of about 2% - 10% nitrogen.

27. The method of Claim 24, wherein the conductive layer comprises an atomic composition of about 5% - 8% nitrogen.

28. The method of Claim 24, wherein both the aluminum layer and the conductive layer have a resistivity of less than about 10 $\mu\Omega$ cm.

29. The method of Claim 24, wherein both the aluminum layer and the conductive layer have a surface roughness of about 300 Å to 400 Å.

30. The method of Claim 24, wherein both the aluminum layer and the conductive layer are substantially hillock-free.